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Summit House Riparian Way Keighley BD20 7BW	19205-PWA-00-XX-CA-C-1000 C01	
Date 16/07/2020	Designed by JS	
File 19205-PWA-00-XX-CA-C-10...	Checked by BLS	
Innovyze	Network 2018.1.1	

STORM SEWER DESIGN by the Modified Rational Method

Design Criteria for Storm

Pipe Sizes STANDARD Manhole Sizes STANDARD

FSR Rainfall Model - England and Wales

Return Period (years)	100	PIMP (%)	100
M5-60 (mm)	19.000	Add Flow / Climate Change (%)	0
Ratio R	0.339	Minimum Backdrop Height (m)	0.200
Maximum Rainfall (mm/hr)	50	Maximum Backdrop Height (m)	1.500
Maximum Time of Concentration (mins)	30	Min Design Depth for Optimisation (m)	1.200
Foul Sewage (l/s/ha)	0.000	Min Vel for Auto Design only (m/s)	1.00
Volumetric Runoff Coeff.	0.750	Min Slope for Optimisation (1:X)	500

Designed with Level Soffits






Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.485	4-8	0.109

Total Area Contributing (ha) = 0.595


Total Pipe Volume (m³) = 150.898

Network Design Table for Storm















PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.000	28.171	0.720	39.1	0.042	4.00	0.0	0.600	o	150	Pipe/Conduit	
2.000	28.130	0.502	56.0	0.042	4.00	0.0	0.600	o	150	Pipe/Conduit	
2.001	29.415	0.368	79.9	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
1.001	11.803	0.120	98.4	0.000	0.00	0.0	0.600	o	300	Pipe/Conduit	
1.002	17.266	0.173	99.8	0.077	0.00	0.0	0.600	o	300	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.000	50.00	4.29	101.500	0.042	0.0	0.0	0.0	1.61	28.5	5.7
2.000	50.00	4.35	101.600	0.042	0.0	0.0	0.0	1.35	23.8	5.7
2.001	50.00	4.78	101.098	0.042	0.0	0.0	0.0	1.13	19.9	5.7
1.001	50.00	4.91	100.580	0.084	0.0	0.0	0.0	1.59	112.1	11.4
1.002	50.00	5.09	98.163	0.161	0.0	0.0	0.0	1.57	111.2	21.9


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Network Design Table for Storm


PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
3.000	20.329	0.339	60.0	0.076	4.00	0.0	0.600	o	150	Pipe/Conduit	
3.001	26.283	1.987	13.2	0.000	0.00	0.0	0.600	o	150	Pipe/Conduit	
4.000	30.000	1.212	24.8	0.052	4.00	0.0	0.600	o	150	Pipe/Conduit	
4.001	10.900	0.110	99.1	0.015	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.000	5.054	0.500	10.1	0.096	4.00	0.0	0.600	o	150	Pipe/Conduit	
5.001	14.047	0.032	439.0	0.000	0.00	0.0	0.600	7 o	-1	Pipe/Conduit	
6.000	35.000	0.350	100.0	0.111	4.00	0.0	0.600	o	300	Pipe/Conduit	
6.001	57.526	2.160	26.6	0.048	0.00	0.0	0.600	o	300	Pipe/Conduit	
6.002	6.108	0.105	58.2	0.023	0.00	0.0	0.600	o	300	Pipe/Conduit	
5.002	11.608	0.026	446.5	0.000	0.00	0.0	0.600	7 o	-1	Pipe/Conduit	
5.003	14.666	0.064	229.2	0.012	0.00	0.0	0.600	o	450	Pipe/Conduit	
4.002	7.736	0.078	99.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	
7.000	59.522	1.050	56.7	0.000	4.00	0.0	0.600	o	450	Pipe/Conduit	
7.001	43.891	1.310	33.5	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
3.000	50.00	4.26	100.466	0.076	0.0	0.0	0.0	1.30	23.0	10.3
3.001	50.00	4.42	100.127	0.076	0.0	0.0	0.0	2.78	49.2	10.3
4.000	50.00	4.25	101.240	0.052	0.0	0.0	0.0	2.03	35.9	7.0
4.001	50.00	4.36	100.028	0.067	0.0	0.0	0.0	1.58	111.6	9.1
5.000	50.00	4.03	99.290	0.096	0.0	0.0	0.0	3.19	56.3	12.9
5.001	50.00	4.18	98.040	0.096	0.0	0.0	0.0	1.49	6628.5	12.9
6.000	50.00	4.37	101.215	0.111	0.0	0.0	0.0	1.57	111.1	15.1
6.001	50.00	4.68	100.865	0.159	0.0	0.0	0.0	3.06	216.2	21.6
6.002	50.00	4.73	98.705	0.182	0.0	0.0	0.0	2.07	146.0	24.6
5.002	50.00	4.86	98.008	0.278	0.0	0.0	0.0	1.48	6572.2	37.6
5.003	50.00	5.05	97.982	0.290	0.0	0.0	0.0	1.34	212.9	39.3
4.002	50.00	5.11	97.918	0.357	0.0	0.0	0.0	2.04	324.7	48.3
7.000	50.00	4.37	100.200	0.000	0.0	0.0	0.0	2.70	430.1	0.0
7.001	50.00	4.57	99.150	0.000	0.0	0.0	0.0	3.52	560.1	0.0


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Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	HYD SECT	DIA (mm)	Section Type	Auto Design
1.003	24.625	0.720	34.2	0.000	0.00	0.0	0.600	o	450	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
1.003	50.00	5.23	97.840	0.595	0.0	0.0	0.0	3.49	554.4	80.5

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	o	150	SW1A	102.200	101.500	0.550	Open Manhole	450
2.000	o	150	SW2A	102.300	101.600	0.550	Open Manhole	450
2.001	o	150	SW2B	102.300	101.098	1.052	Open Manhole	450
1.001	o	300	SW1B	102.200	100.580	1.320	Open Manhole	450
1.002	o	300	SW1C	101.856	98.163	3.393	Open Manhole	1200
3.000	o	150	SW3A	101.939	100.466	1.323	Open Manhole	1200
3.001	o	150	SW3B	101.700	100.127	1.423	Open Manhole	1200
4.000	o	150	SW4B	102.000	101.240	0.610	Open Manhole	450
4.001	o	300	SW4C	101.691	100.028	1.363	Open Manhole	1200
5.000	o	150	SW5A	100.081	99.290	0.641	Open Manhole	450
5.001	7 o	-1	JUNCTION	101.297	98.040	2.357	Junction	
6.000	o	300	SW6A	102.440	101.215	0.925	Open Manhole	1200
6.001	o	300	SW6B	102.349	100.865	1.184	Open Manhole	1200
6.002	o	300	SW6C	101.837	98.705	2.832	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
1.000	28.171	39.1	SW1B	102.200	100.780	1.270	Open Manhole	450
2.000	28.130	56.0	SW2B	102.300	101.098	1.052	Open Manhole	450
2.001	29.415	79.9	SW1B	102.200	100.730	1.320	Open Manhole	450
1.001	11.803	98.4	SW1C	101.856	100.460	1.096	Open Manhole	1200
1.002	17.266	99.8	SW1D	100.758	97.990	2.468	Open Manhole	1500
3.000	20.329	60.0	SW3B	101.700	100.127	1.423	Open Manhole	1200
3.001	26.283	13.2	SW1D	100.758	98.140	2.468	Open Manhole	1500
4.000	30.000	24.8	SW4C	101.691	100.028	1.513	Open Manhole	1200
4.001	10.900	99.1	SW4D	101.005	99.918	0.787	Open Manhole	1500
5.000	5.054	10.1	JUNCTION	101.297	98.790	2.357	Junction	
5.001	14.047	439.0	JUNCTION	101.393	98.008	2.485	Junction	
6.000	35.000	100.0	SW6B	102.349	100.865	1.184	Open Manhole	1200
6.001	57.526	26.6	SW6C	101.837	98.705	2.832	Open Manhole	1200
6.002	6.108	58.2	JUNCTION	101.393	98.600	2.493	Junction	

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PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.002	7	o -1	JUNCTION	101.393	98.008	2.485	Junction	
5.003		o 450	JUNCTION	101.585	97.982	3.153	Junction	
4.002		o 450	SW4D	101.005	97.918	2.637	Open Manhole	1500
7.000		o 450	EXSW7A	101.800	100.200	1.150	Open Manhole	1200
7.001		o 450	EXSW7B	102.150	99.150	2.550	Open Manhole	1200
1.003		o 450	SW1D	100.758	97.840	2.468	Open Manhole	1500

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
5.002	11.608	446.5	JUNCTION	101.585	97.982	2.703	Junction	
5.003	14.666	229.2	SW4D	101.005	97.918	2.637	Open Manhole	1500
4.002	7.736	99.2	SW1D	100.758	97.840	2.468	Open Manhole	1500
7.000	59.522	56.7	EXSW7B	102.150	99.150	2.550	Open Manhole	1200
7.001	43.891	33.5	SW1D	100.758	97.840	2.468	Open Manhole	1500
1.003	24.625	34.2		99.520	97.120	1.950	Open Manhole	0

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Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	-	-	100	0.042	0.042	0.042
2.000	-	-	100	0.042	0.042	0.042
2.001	-	-	100	0.000	0.000	0.000
1.001	-	-	100	0.000	0.000	0.000
1.002	User	-	100	0.071	0.071	0.071
	User	-	100	0.007	0.007	0.077
3.000	User	-	100	0.076	0.076	0.076
3.001	-	-	100	0.000	0.000	0.000
4.000	User	-	100	0.052	0.052	0.052
4.001	User	-	100	0.015	0.015	0.015
5.000	User	-	100	0.056	0.056	0.056
	User	-	100	0.003	0.003	0.059
	User	-	100	0.037	0.037	0.096
5.001	-	-	100	0.000	0.000	0.000
6.000	User	-	100	0.084	0.084	0.084
	User	-	100	0.027	0.027	0.111
6.001	User	-	100	0.048	0.048	0.048
6.002	User	-	100	0.023	0.023	0.023
5.002	-	-	100	0.000	0.000	0.000
5.003	User	-	100	0.012	0.012	0.012
4.002	-	-	100	0.000	0.000	0.000
7.000	-	-	100	0.000	0.000	0.000
7.001	-	-	100	0.000	0.000	0.000
1.003	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.595	0.595	0.595


Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
1.003		99.520	97.120	0.000	0	0

Simulation Criteria for Storm


Volumetric Runoff Coeff	0.750	Additional Flow - % of Total Flow	0.000
Areal Reduction Factor	1.000	MADD Factor * 10m ³ /ha Storage	2.000
Hot Start (mins)	0	Inlet Coefficient	0.800
Hot Start Level (mm)	0	Flow per Person per Day (l/per/day)	0.000
Manhole Headloss Coeff (Global)	0.500	Run Time (mins)	60
Foul Sewage per hectare (l/s)	0.000	Output Interval (mins)	1
Number of Input Hydrographs	0	Number of Storage Structures	0
Number of Online Controls	1	Number of Time/Area Diagrams	0
Number of Offline Controls	0	Number of Real Time Controls	0

Synthetic Rainfall Details

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Simulation Criteria for Storm

Rainfall Model	FSR	Profile Type	Summer
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Storm Duration (mins)	30
Ratio R	0.339		

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Online Controls for Storm


Hydro-Brake® Optimum Manhole: SW1D, DS/PN: 1.003, Volume (m³): 14.5

Unit Reference	MD-SHE-0242-3600-2000-3600
Design Head (m)	2.000
Design Flow (l/s)	36.0
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	242
Invert Level (m)	97.840
Minimum Outlet Pipe Diameter (mm)	300
Suggested Manhole Diameter (mm)	2100

Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	2.000	36.0
Flush-Flo™	0.594	36.0
Kick-Flo®	1.289	29.2
Mean Flow over Head Range	-	31.1

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	7.9	1.200	31.5	3.000	43.7	7.000	65.9
0.200	24.6	1.400	30.3	3.500	47.1	7.500	68.2
0.300	33.3	1.600	32.3	4.000	50.3	8.000	70.3
0.400	35.0	1.800	34.2	4.500	53.2	8.500	72.4
0.500	35.8	2.000	36.0	5.000	56.0	9.000	74.5
0.600	36.0	2.200	37.7	5.500	58.6	9.500	76.5
0.800	35.4	2.400	39.3	6.000	61.2		
1.000	34.2	2.600	40.8	6.500	63.6		

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1 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 0
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.339
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status ON
Inertia Status ON


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW1A	15 Winter	1	+0%				
2.000	SW2A	15 Winter	1	+0%	100/15	Summer		
2.001	SW2B	15 Winter	1	+0%	100/15	Summer		
1.001	SW1B	15 Winter	1	+0%				
1.002	SW1C	15 Winter	1	+0%	30/15	Summer		
3.000	SW3A	15 Winter	1	+0%	30/15	Summer		
3.001	SW3B	15 Winter	1	+0%				
4.000	SW4B	15 Winter	1	+0%				
4.001	SW4C	15 Winter	1	+0%				
5.000	SW5A	15 Winter	1	+0%	100/15	Summer	100/60	Winter
5.001	JUNCTION	15 Winter	1	+0%				
6.000	SW6A	15 Winter	1	+0%				
6.001	SW6B	15 Winter	1	+0%				
6.002	SW6C	15 Winter	1	+0%	100/15	Summer		
5.002	JUNCTION	15 Winter	1	+0%				
5.003	JUNCTION	15 Winter	1	+0%	30/15	Winter		
4.002	SW4D	15 Winter	1	+0%	30/15	Summer		
7.000	EXSW7A	60 Winter	1	+0%				
7.001	EXSW7B	60 Winter	1	+0%	100/30	Winter		

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1 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Overflow Cap. (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1A	101.546	-0.104	0.000	0.21	5.6	OK	
2.000	SW2A	101.650	-0.100	0.000	0.25	5.6	OK	
2.001	SW2B	101.153	-0.095	0.000	0.29	5.5	OK	
1.001	SW1B	100.651	-0.229	0.000	0.13	11.1	OK	
1.002	SW1C	98.255	-0.208	0.000	0.20	19.2	OK	
3.000	SW3A	100.538	-0.078	0.000	0.47	10.2	OK	
3.001	SW3B	100.174	-0.103	0.000	0.22	10.2	OK	
4.000	SW4B	101.285	-0.105	0.000	0.20	6.9	OK	
4.001	SW4C	100.092	-0.236	0.000	0.10	8.5	OK	
5.000	SW5A	99.345	-0.095	0.000	0.29	12.8	OK	1
5.001	JUNCTION	98.195	-0.745	0.000	0.00	12.4	OK*	
6.000	SW6A	101.291	-0.224	0.000	0.14	14.8	OK	
6.001	SW6B	100.928	-0.237	0.000	0.10	19.6	OK	
6.002	SW6C	98.812	-0.193	0.000	0.27	22.1	OK	
5.002	JUNCTION	98.195	-0.713	0.000	0.00	22.5	OK*	
5.003	JUNCTION	98.194	-0.238	0.000	0.15	25.4	OK*	
4.002	SW4D	98.188	-0.180	0.000	0.17	28.0	OK	
7.000	EXSW7A	100.200	-0.450	0.000	0.00	0.0	OK	
7.001	EXSW7B	99.150	-0.450	0.000	0.00	0.0	OK	

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Summit House Riparian Way Keighley BD20 7BW	19205-PWA-00-XX-CA-C-1000 C01	
Date 16/07/2020 File 19205-PWA-00-XX-CA-C-10...	Designed by JS Checked by BLS	
Innovyze	Network 2018.1.1	

1 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.003	SW1D	15 Winter	1	+0%	30/15 Summer				98.182

PN	US/MH Name	Surcharged			Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap.	Flow / (l/s)	Flow / (l/s)	Status		
1.003	SW1D	-0.108	0.000	0.07		34.1	OK		

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Date 16/07/2020 File 19205-PWA-00-XX-CA-C-10...	Designed by JS Checked by BLS	
Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 0
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.339
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status ON
Inertia Status ON


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW1A	15 Winter	30	+0%				
2.000	SW2A	15 Winter	30	+0%	100/15	Summer		
2.001	SW2B	15 Winter	30	+0%	100/15	Summer		
1.001	SW1B	15 Winter	30	+0%				
1.002	SW1C	15 Winter	30	+0%	30/15	Summer		
3.000	SW3A	15 Winter	30	+0%	30/15	Summer		
3.001	SW3B	15 Winter	30	+0%				
4.000	SW4B	15 Winter	30	+0%				
4.001	SW4C	15 Summer	30	+0%				
5.000	SW5A	15 Winter	30	+0%	100/15	Summer	100/60	Winter
5.001	JUNCTION	15 Summer	30	+0%				
6.000	SW6A	15 Winter	30	+0%				
6.001	SW6B	15 Winter	30	+0%				
6.002	SW6C	15 Winter	30	+0%	100/15	Summer		
5.002	JUNCTION	15 Summer	30	+0%				
5.003	JUNCTION	30 Winter	30	+0%	30/15	Winter		
4.002	SW4D	15 Summer	30	+0%	30/15	Summer		
7.000	EXSW7A	60 Winter	30	+0%				
7.001	EXSW7B	60 Winter	30	+0%	100/30	Winter		

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Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm


PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1A	101.575	-0.075	0.000	0.50		13.8	OK	
2.000	SW2A	101.684	-0.066	0.000	0.60		13.7	OK	
2.001	SW2B	101.193	-0.055	0.000	0.71		13.6	OK	
1.001	SW1B	100.696	-0.184	0.000	0.31		27.2	OK	
1.002	SW1C	98.628	0.165	0.000	0.53		50.5	SURCHARGED	
3.000	SW3A	100.690	0.074	0.000	1.09		23.6	SURCHARGED	
3.001	SW3B	100.203	-0.074	0.000	0.51		23.7	OK	
4.000	SW4B	101.314	-0.076	0.000	0.49		16.9	OK	
4.001	SW4C	100.132	-0.196	0.000	0.26		21.9	OK	
5.000	SW5A	99.383	-0.057	0.000	0.71		31.3	OK	1
5.001	JUNCTION	98.433	-0.507	0.000	0.01		30.3	OK*	
6.000	SW6A	101.339	-0.176	0.000	0.36		36.3	OK	
6.001	SW6B	100.967	-0.198	0.000	0.25		51.4	OK	
6.002	SW6C	98.897	-0.108	0.000	0.72		58.4	OK	
5.002	JUNCTION	98.433	-0.475	0.000	0.01		28.9	OK*	
5.003	JUNCTION	98.517	0.085	0.000	0.21		35.5	SURCHARGED*	
4.002	SW4D	98.447	0.079	0.000	0.22		36.5	SURCHARGED	
7.000	EXSW7A	100.200	-0.450	0.000	0.00		0.0	OK	
7.001	EXSW7B	99.150	-0.450	0.000	0.00		0.0	OK	

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Innovyze	Network 2018.1.1	

30 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.003	SW1D	240	Summer	30	+0%	30/15	Summer		98.229

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status	
1.003	SW1D	-0.061	0.000	0.08		34.8	OK	

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Innovyze	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor 1.000 Additional Flow - % of Total Flow 0.000
Hot Start (mins) 0 MADD Factor * 10m³/ha Storage 2.000
Hot Start Level (mm) 0 Inlet Coefficient 0.800
Manhole Headloss Coeff (Global) 0.500 Flow per Person per Day (l/per/day) 0.000
Foul Sewage per hectare (l/s) 0.000

Number of Input Hydrographs 0 Number of Storage Structures 0
Number of Online Controls 1 Number of Time/Area Diagrams 0
Number of Offline Controls 0 Number of Real Time Controls 0


Synthetic Rainfall Details

Rainfall Model FSR Ratio R 0.339
Region England and Wales Cv (Summer) 0.750
M5-60 (mm) 19.000 Cv (Winter) 0.840

Margin for Flood Risk Warning (mm) 300.0
Analysis Timestep 2.5 Second Increment (Extended)
DTS Status ON
DVD Status ON
Inertia Status ON


Profile(s) Summer and Winter
Duration(s) (mins) 15, 30, 60, 120, 240, 360, 480, 960, 1440
Return Period(s) (years) 1, 30, 100
Climate Change (%) 0, 0, 40

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surge	First (Y) Flood	First (Z) Overflow	Overflow Act.
1.000	SW1A	15 Winter	100	+40%				
2.000	SW2A	15 Winter	100	+40%	100/15	Summer		
2.001	SW2B	15 Winter	100	+40%	100/15	Summer		
1.001	SW1B	15 Winter	100	+40%				
1.002	SW1C	15 Summer	100	+40%	30/15	Summer		
3.000	SW3A	15 Winter	100	+40%	30/15	Summer		
3.001	SW3B	15 Winter	100	+40%				
4.000	SW4B	15 Winter	100	+40%				
4.001	SW4C	15 Summer	100	+40%				
5.000	SW5A	15 Winter	100	+40%	100/15	Summer	100/60	Winter
5.001	JUNCTION	15 Winter	100	+40%				
6.000	SW6A	15 Winter	100	+40%				
6.001	SW6B	15 Winter	100	+40%				
6.002	SW6C	15 Winter	100	+40%	100/15	Summer		
5.002	JUNCTION	15 Summer	100	+40%				
5.003	JUNCTION	60 Winter	100	+40%	30/15	Winter		
4.002	SW4D	60 Winter	100	+40%	30/15	Summer		
7.000	EXSW7A	60 Winter	100	+40%				
7.001	EXSW7B	60 Winter	100	+40%	100/30	Winter		

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Summit House Riparian Way Keighley BD20 7BW	19205-PWA-00-XX-CA-C-1000 C01	
Date 16/07/2020 File 19205-PWA-00-XX-CA-C-10...	Designed by JS Checked by BLS	
Innovyze	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

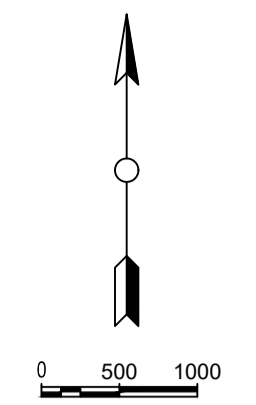
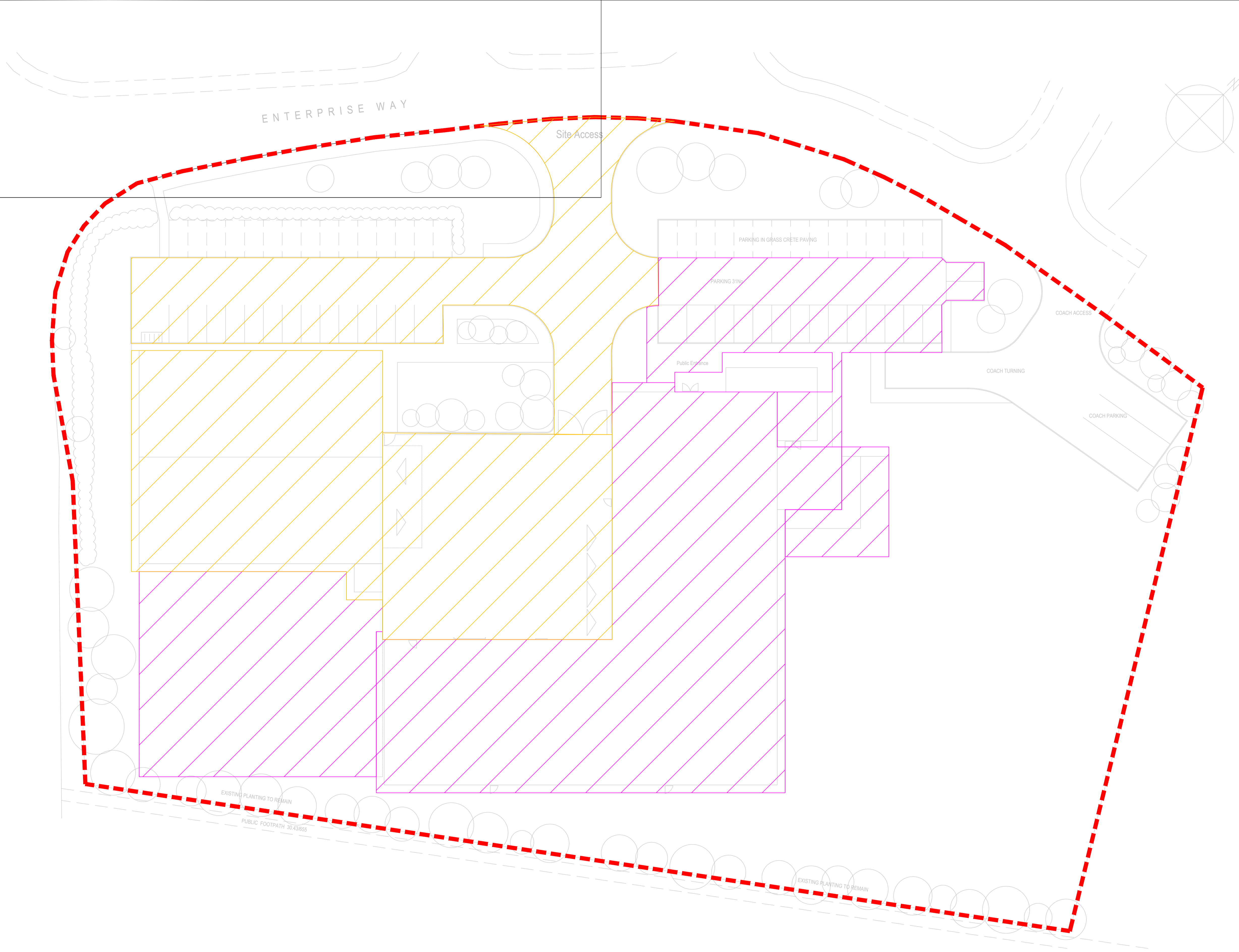
PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m ³)	Flow / Cap.	Overflow (l/s)	Pipe Flow (l/s)	Status	Level Exceeded
1.000	SW1A	101.612	-0.038	0.000	0.91		24.9	OK	
2.000	SW2A	101.890	0.140	0.000	1.00		22.7	SURCHARGED	
2.001	SW2B	101.384	0.136	0.000	1.18		22.4	SURCHARGED	
1.001	SW1B	100.737	-0.143	0.000	0.53		45.8	OK	
1.002	SW1C	98.840	0.377	0.000	0.98		93.3	SURCHARGED	
3.000	SW3A	101.417	0.801	0.000	1.83		39.5	SURCHARGED	
3.001	SW3B	100.233	-0.044	0.000	0.84		39.4	OK	
4.000	SW4B	101.350	-0.040	0.000	0.89		30.6	OK	
4.001	SW4C	100.174	-0.154	0.000	0.48		39.7	OK	
5.000	SW5A	99.693	0.253	0.000	1.21		53.4	SURCHARGED	1
5.001	JUNCTION	98.910	-0.030	0.000	0.01		51.8	OK*	
6.000	SW6A	101.391	-0.124	0.000	0.64		65.7	OK	
6.001	SW6B	101.008	-0.157	0.000	0.45		93.0	OK	
6.002	SW6C	99.070	0.065	0.000	1.30		105.3	SURCHARGED	
5.002	JUNCTION	98.778	-0.130	0.000	0.01		31.8	OK*	
5.003	JUNCTION	98.882	0.450	0.000	0.24		41.0	SURCHARGED*	
4.002	SW4D	100.100	1.732	0.000	0.23		38.5	SURCHARGED	
7.000	EXSW7A	100.200	-0.450	0.000	0.00		0.0	OK	
7.001	EXSW7B	100.097	0.497	0.000	0.03		13.7	SURCHARGED	

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Summit House Riparian Way Keighley BD20 7BW	19205-PWA-00-XX-CA-C-1000 C01	
Date 16/07/2020 File 19205-PWA-00-XX-CA-C-10...	Designed by JS Checked by BLS	
Innovyze	Network 2018.1.1	

100 year Return Period Summary of Critical Results by Maximum Outflow (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
1.003	SW1D	60 Winter	100	+40%	30/15 Summer				100.096

PN	US/MH Name	Surcharged		Flooded		Pipe		Level Exceeded
		Depth (m)	Volume (m ³)	Flow / Cap. (l/s)	Overflow (l/s)	Flow (l/s)	Status	
1.003	SW1D	1.806	0.000	0.08		38.1	SURCHARGED	



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KEY

AREA	IMPERMEABLE CATCHMENT AREA, m ² (ha)
PROPOSED IMPERMEABLE	3233m ² (0.323ha)
EXISTING IMPERMEABLE	2599m ² (0.259ha)
TOTAL	5832m ² (0.583ha)

*TOTALS FOR HECTARES (ha) AND METERS SQUARED (m²) DIFFER SLIGHTLY DUE TO ROUNDING AND ACCUMULATION OF INDIVIDUAL AREAS.

SITE BOUNDARY

NYMNPA
17/07/2020

CD1	16/07/20	CONSTRUCTION ISSUE	S	BLS
PD1	19/03/20	FIRST ISSUE	LE	BLS
Rev	Date	Remarks	Drawn	Checkd

Paul Waite Associates
Consulting Civil, Structural & Geo-Environmental Engineers
Summit House, Riparian Way, The Crossings, Crosshills, Keighley, BD20 7BW

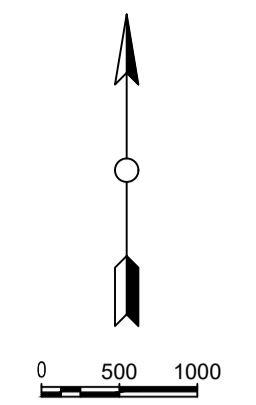
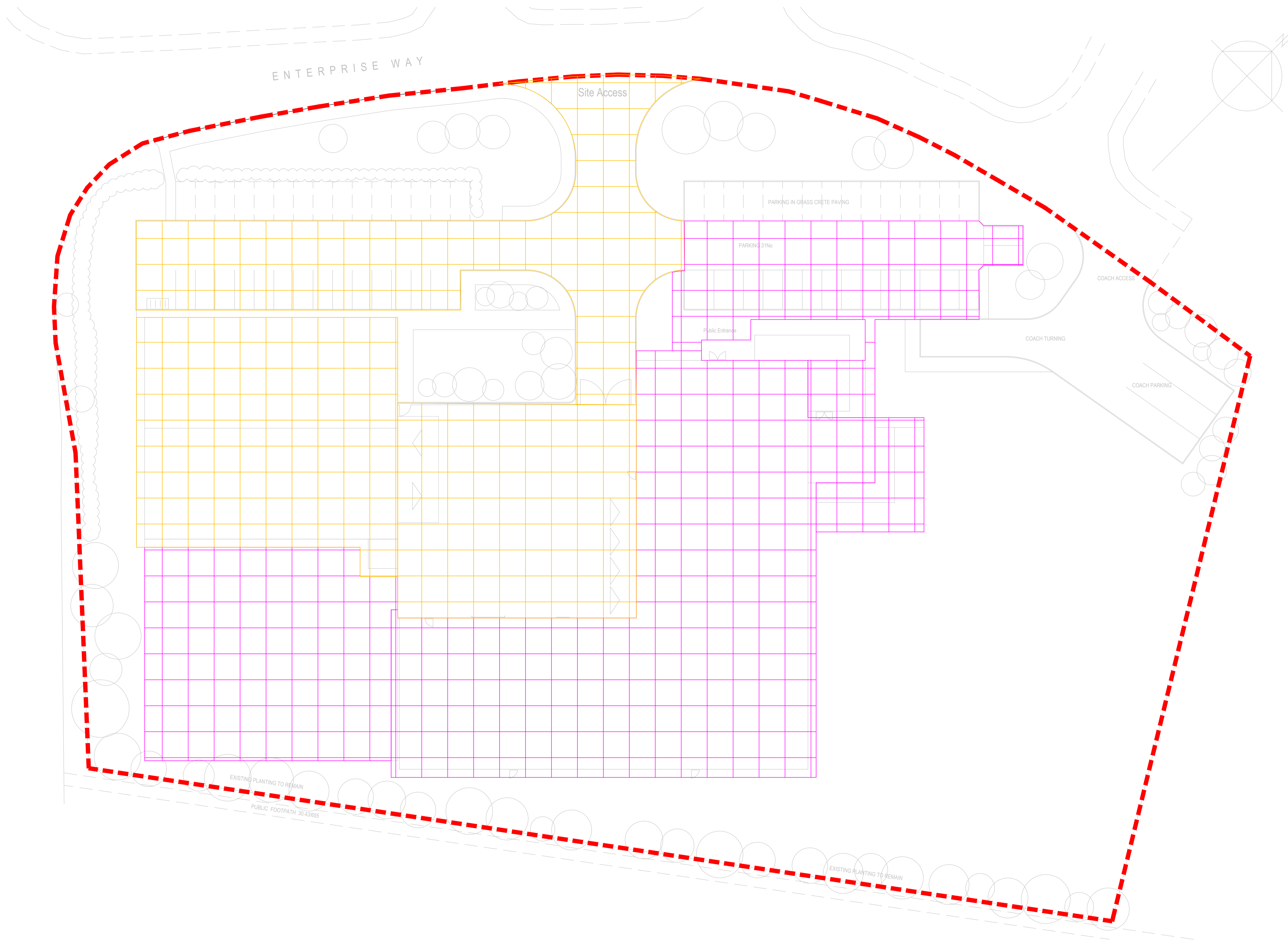
pwa
Geo-Environmental

Client	BOTHAMS BAKERY
Project	PROPOSED EXTENSION BOTHAMS WHITBY
Title	EXISTING IMPERMEABLE AREA PLAN

Size	Scale	Designed	Checked	Date
A1	1:250	JLE	BLS	MAR 20

Drawing Status: **CONSTRUCTION**

Job Number	Originator	Zone	Level	Type	Role	Drawing No.	Rev
19205 - PWA - 00 - XX - DR - C - 1000							CD1



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AREA	IMPERMEABLE CATCHMENT AREA, m ² (ha)
PROPOSED IMPERMEABLE	3233m ² (0.323ha)

*TOTALS FOR HECTARES (ha) AND METERS SQUARED (m²) DIFFER SLIGHTLY DUE TO ROUNDING AND ACCUMULATION OF INDIVIDUAL AREAS.

AREA	IMPERMEABLE CATCHMENT AREA, m ² (ha)
EXISTING IMPERMEABLE	2599m ² (0.259ha)

*TOTALS FOR HECTARES (ha) AND METERS SQUARED (m²) DIFFER SLIGHTLY DUE TO ROUNDING AND ACCUMULATION OF INDIVIDUAL AREAS.

NYMNP
 17/07/2020

Rev	Date	Remarks	Drawn	Checkd
CD1	16/07/20	CONSTRUCTION ISSUE	JLE	BLS
PD1	23/03/20	FIRST ISSUE	JLE	BLS



Paul Waite Associates

Consulting Civil, Structural & Geo-Environmental Engineers
Summit House Pt. Aran Way - The Crossin s. Crosshills, Kei Hie, 8020 TBW

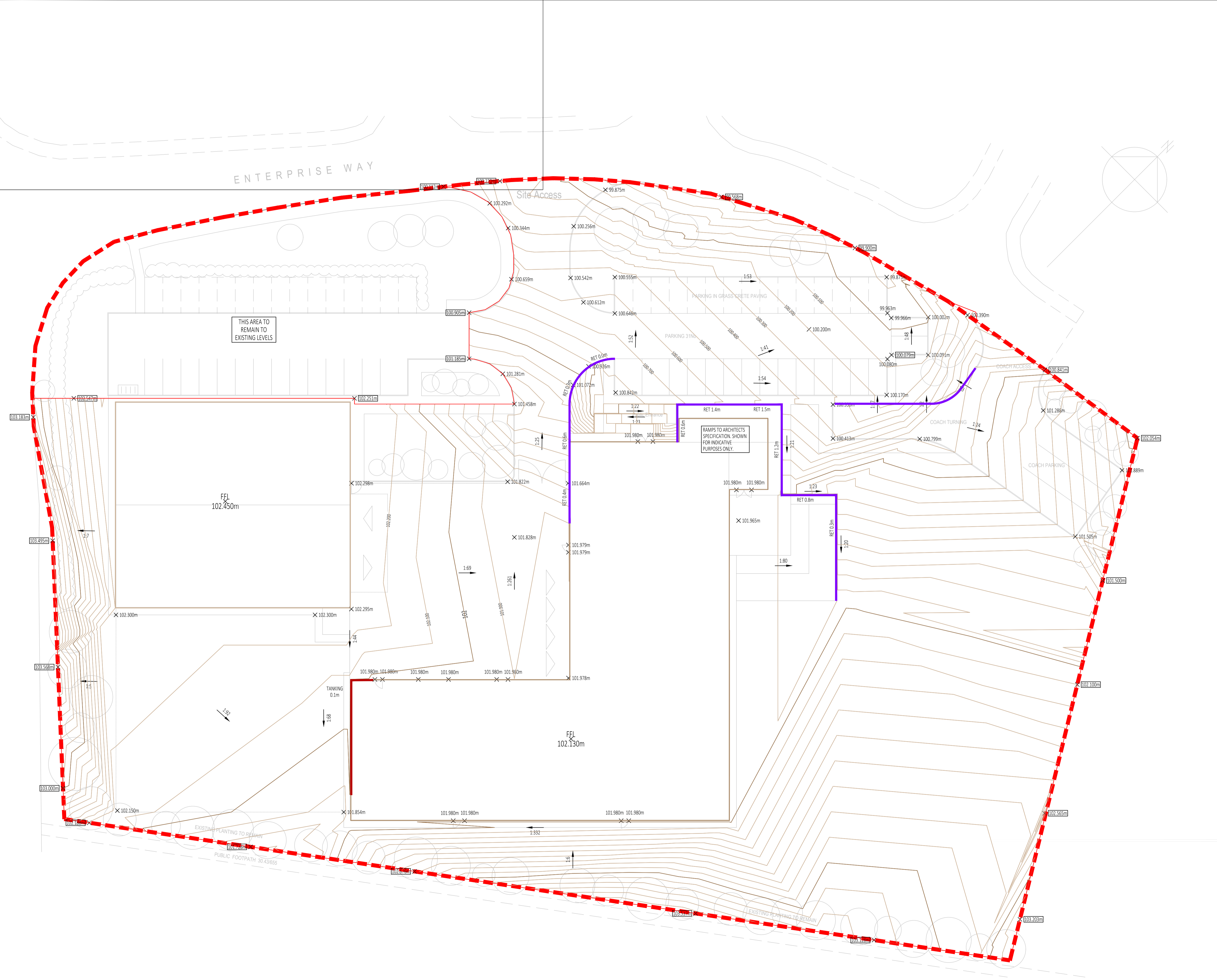


pwa
Geo-Environmental

Client	BOTHAMS BAKERY
Project	PROPOSED EXTENSION BOTHAMS WHITBY
Title	PROPOSED IMPERMEABLE AREA PLAN
Size	A1
Scale	1:250
Designed	JLE
Checked	BLS
Date	OCT 19
Drawing Status	CONSTRUCTION
Job Number	19205 - PWA - 00 - XX - DR - C - 1001
Originator	C01
Zone	
Level	
Type	
Role	
Drawing No.	
Rev	

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- KEY
- × 100.000m EXISTING SPOT LEVELS
 - × 100.000m PROPOSED SPOT LEVELS
 - 100.000m CONTOUR LABEL
 - 1:100 PROPOSED GRADIENT
 - SITE BOUNDARY
 - RETAINING WALL
 - TANKING



NYMNPA
17/07/2020

CO1	16/07/20	CONSTRUCTION ISSUE	JS	BLS
PO1	23/03/20	FIRST ISSUE	JS	BLS
Rev	Date	Remarks	Drawn	Checked




 Consulting Civil, Structural & Geo-Environmental Engineers
 Summit House Riarian Way The Crossins Crosshills Kei Hill BD20 7BW

Client
BOTHAMS OF WHITBY

Project
SUDS SCHEME FOR PLANNING

Title
EXTERNAL WORKS

Size	Scale	Designed	Checked	Date
A1	1:250	JS	BLS	MAR 20

Drawing Status
CONSTRUCTION

Job Number	Originator	Volume	Level	Type	Role	Drawing No.	Rev
19205	PWA	00	XX	DR	C	2000	CO1